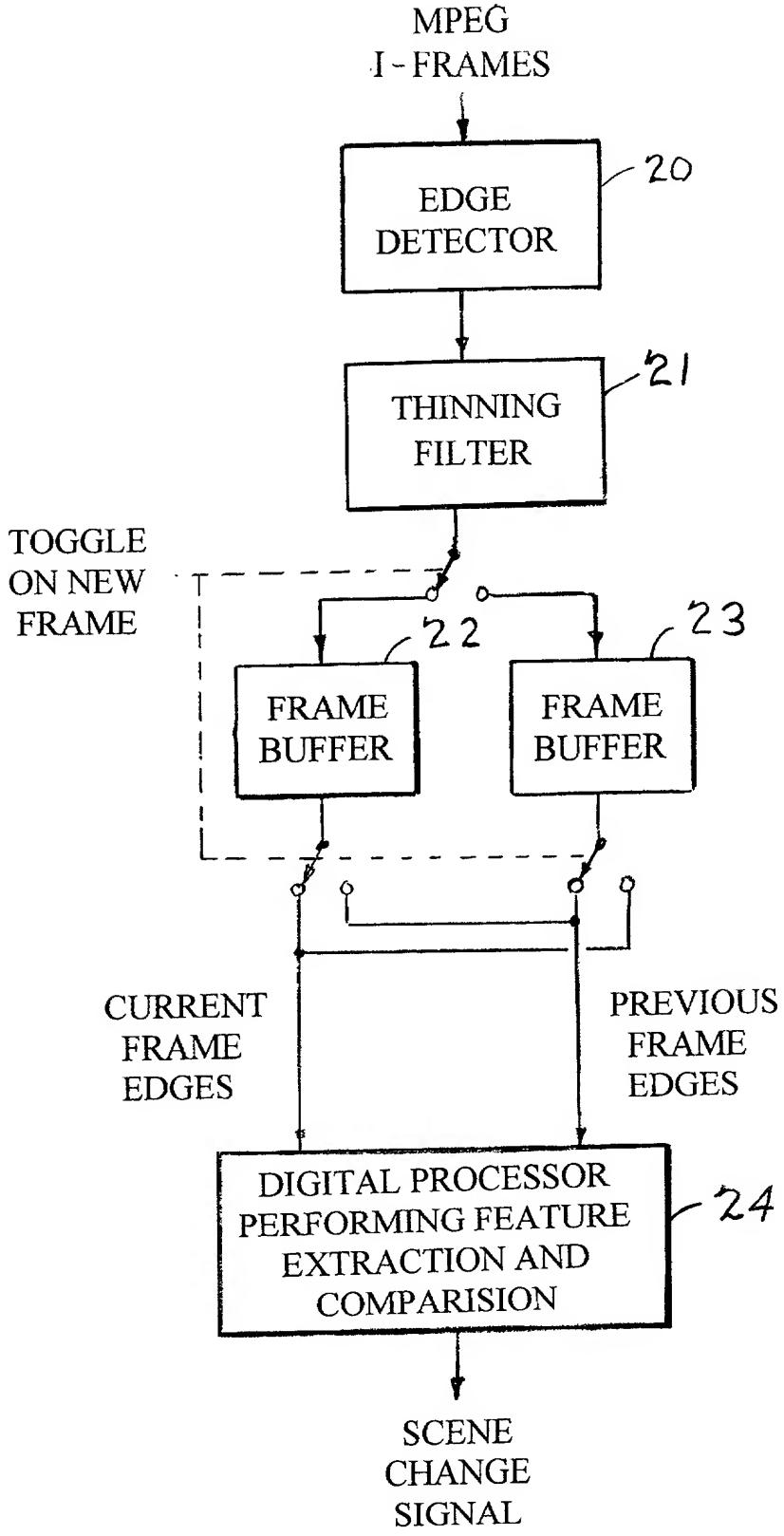
MPEG
I-FRAMES
EDGE
DETECTOR
20
THINNING
FILTER
21
TOGGLE
ON NEW
FRAME
22
23
FRAME
BUFFER
FRAME
BUFFER
CURRENT
FRAME
EDGES
PREVIOUS
FRAME
EDGES
DIGITAL PROCESSOR
PERFORMING FEATURE
EXTRACTION AND
COMPARISION
24
SCENE
CHANGE
SIGNAL

FIG. 1

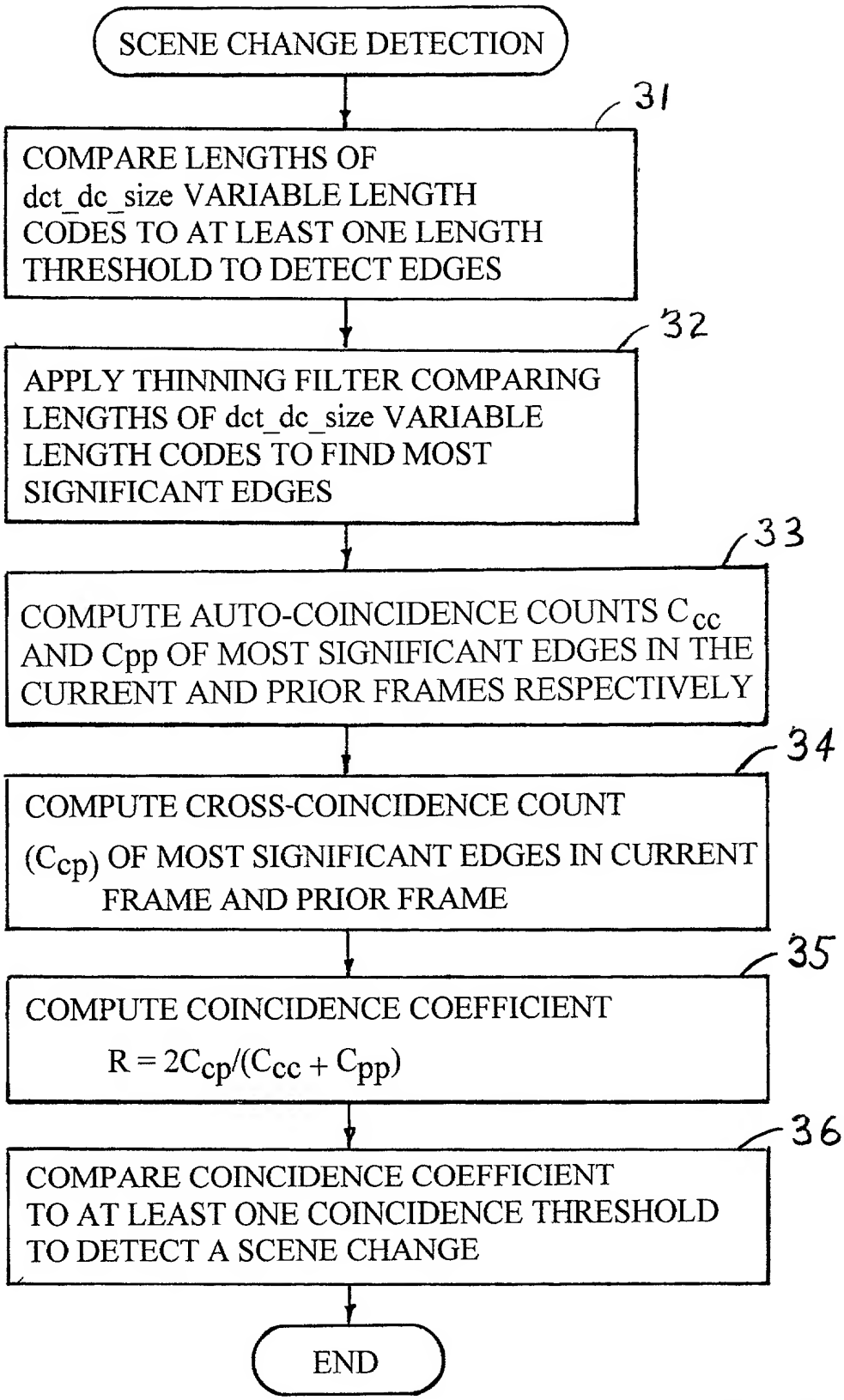
SCENE CHANGE DETECTION
31
COMPARE LENGTHS OF dct_dc_size VARIABLE LENGTH CODES TO AT LEAST ONE LENGTH THRESHOLD TO DETECT EDGES
32
APPLY THINNING FILTER COMPARING LENGTHS OF dct_dc_size VARIABLE LENGTH CODES TO FIND MOST SIGNIFICANT EDGES
33
COMPUTE AUTO-COINCIDENCE COUNTS C_{cc} AND Cpp OF MOST SIGNIFICANT EDGES IN THE CURRENT AND PRIOR FRAMES RESPECTIVELY
34
COMPUTE CROSS-COINCIDENCE COUNT (C_{cp}) OF MOST SIGNIFICANT EDGES IN CURRENT FRAME AND PRIOR FRAME
35
COMPUTE COINCIDENCE COEFFICIENT $R = 2C_{cp}/(C_{cc} + C_{pp})$
36
COMPARE COINCIDENCE COEFFICIENT TO AT LEAST ONE COINCIDENCE THRESHOLD TO DETECT A SCENE CHANGE
END

FIG. 2

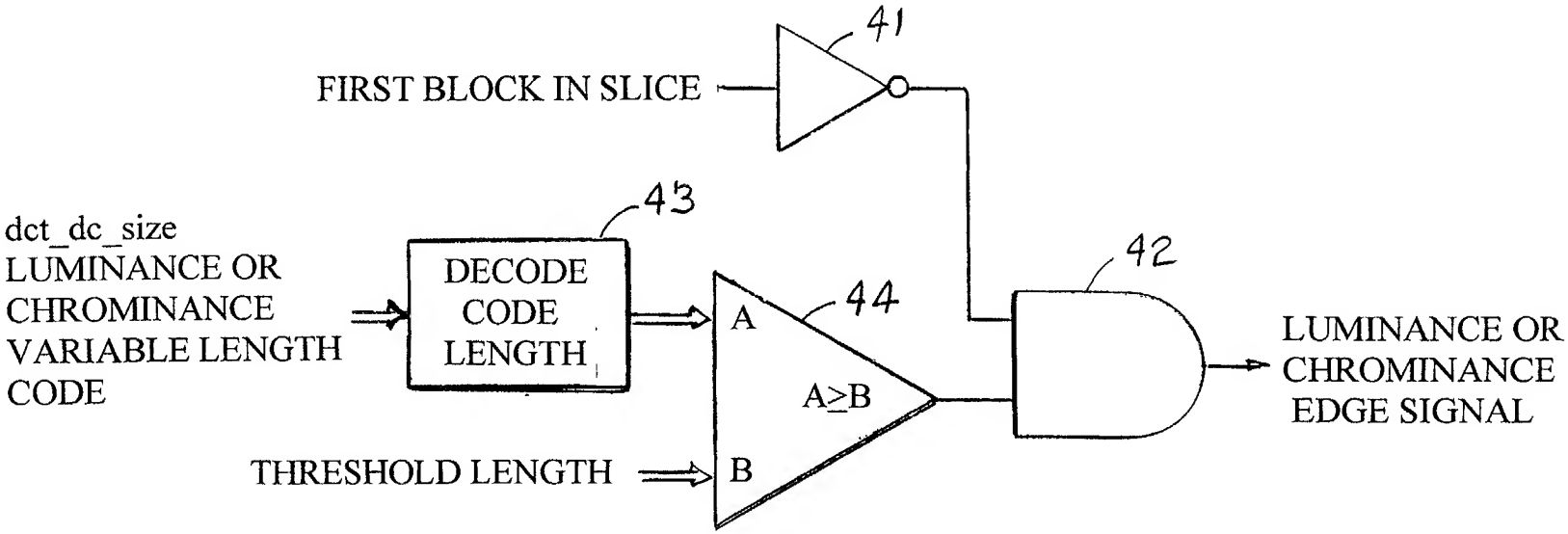
41
FIRST BLOCK IN SLICE
43
dct_dc_size
LUMINANCE OR
CHROMINANCE
VARIABLE LENGTH
CODE
DECODE
CODE
LENGTH
44
A
A≥B
B
THRESHOLD LENGTH
42
LUMINANCE OR
CHROMINANCE
EDGE SIGNAL

FIG. 3

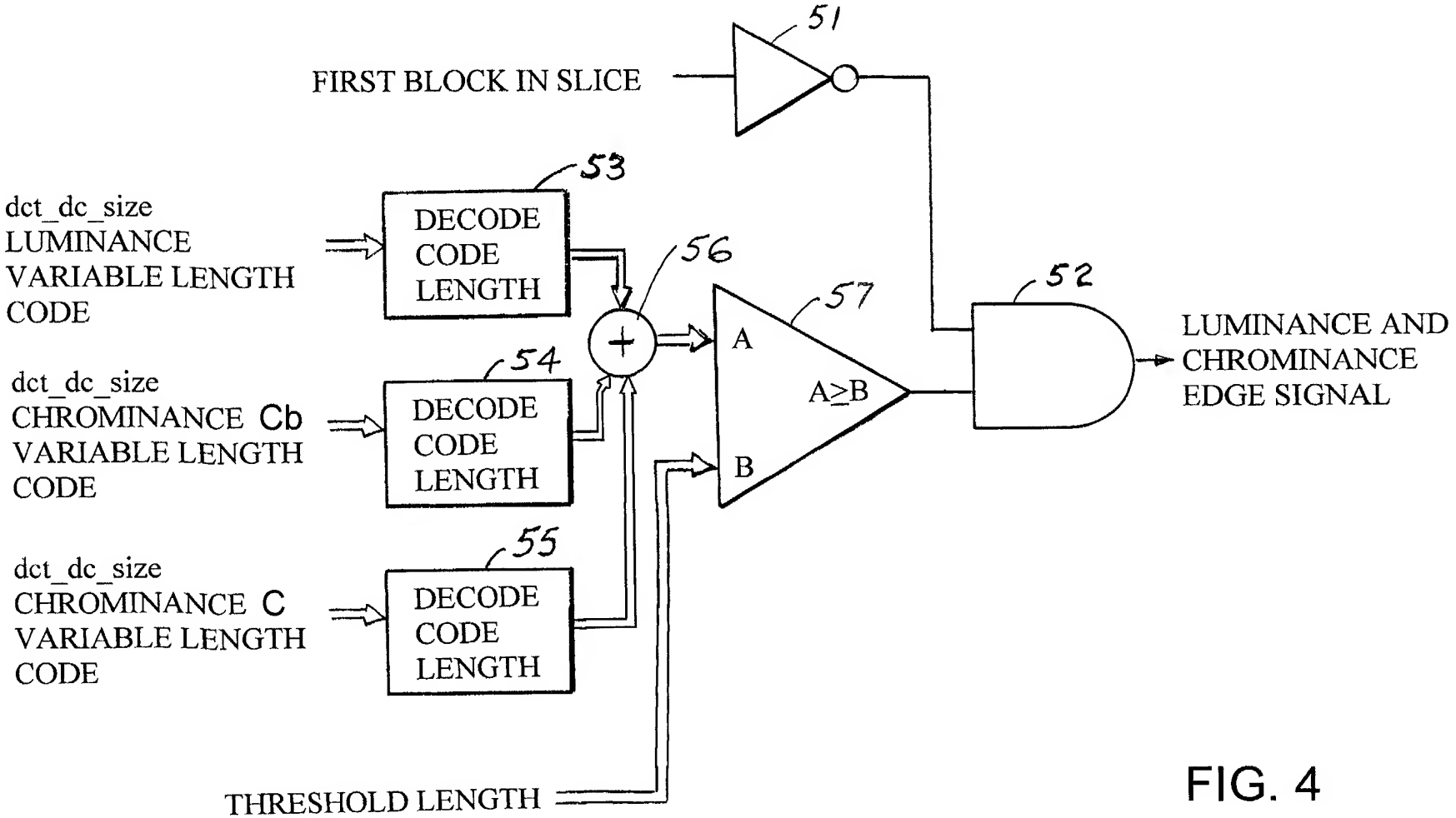

FIG. 4

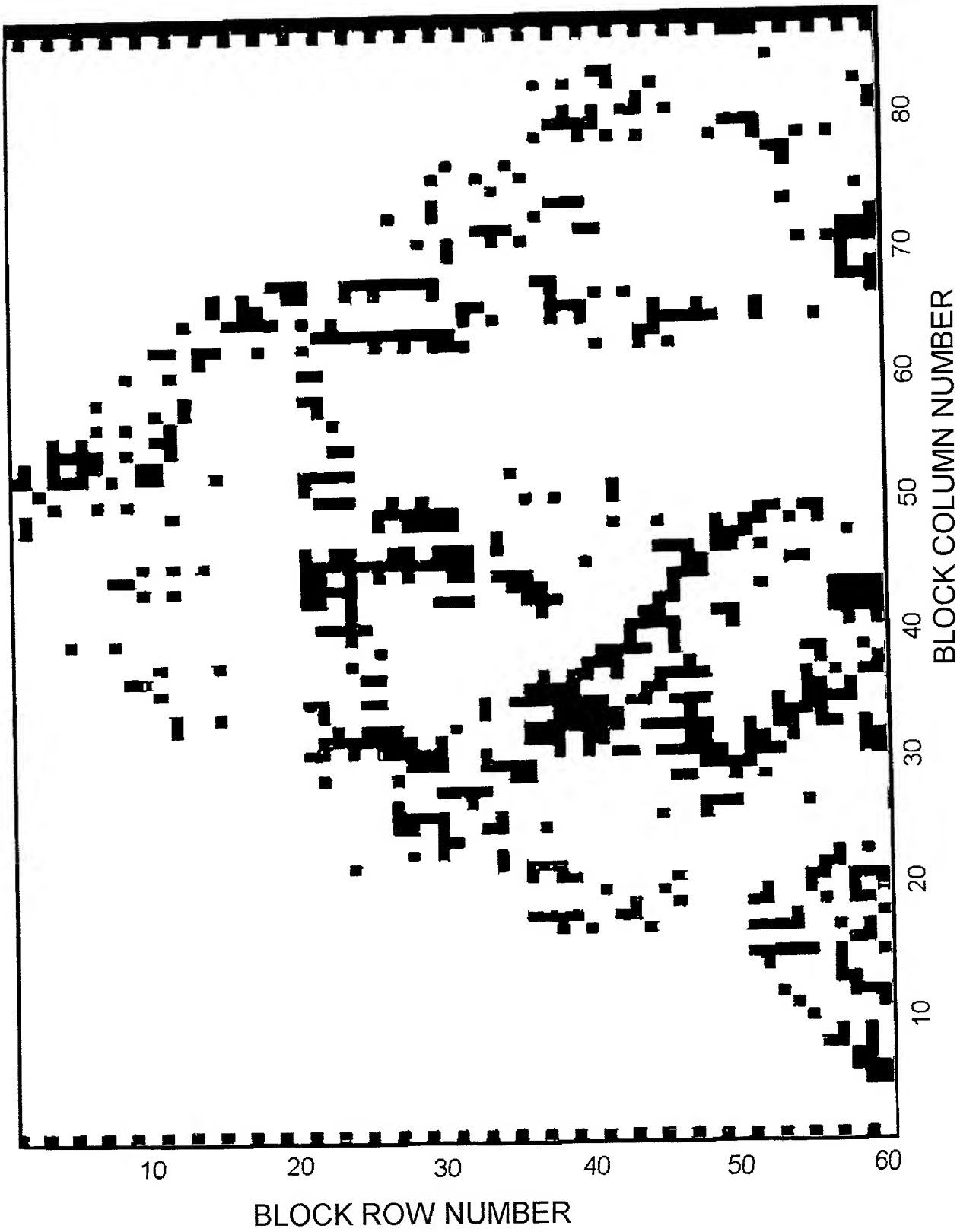
10
20
30
40
50
60
BLOCK ROW NUMBER
10
20
30
40
50
60
70
80
BLOCK COLUMN NUMBER

FIG. 5

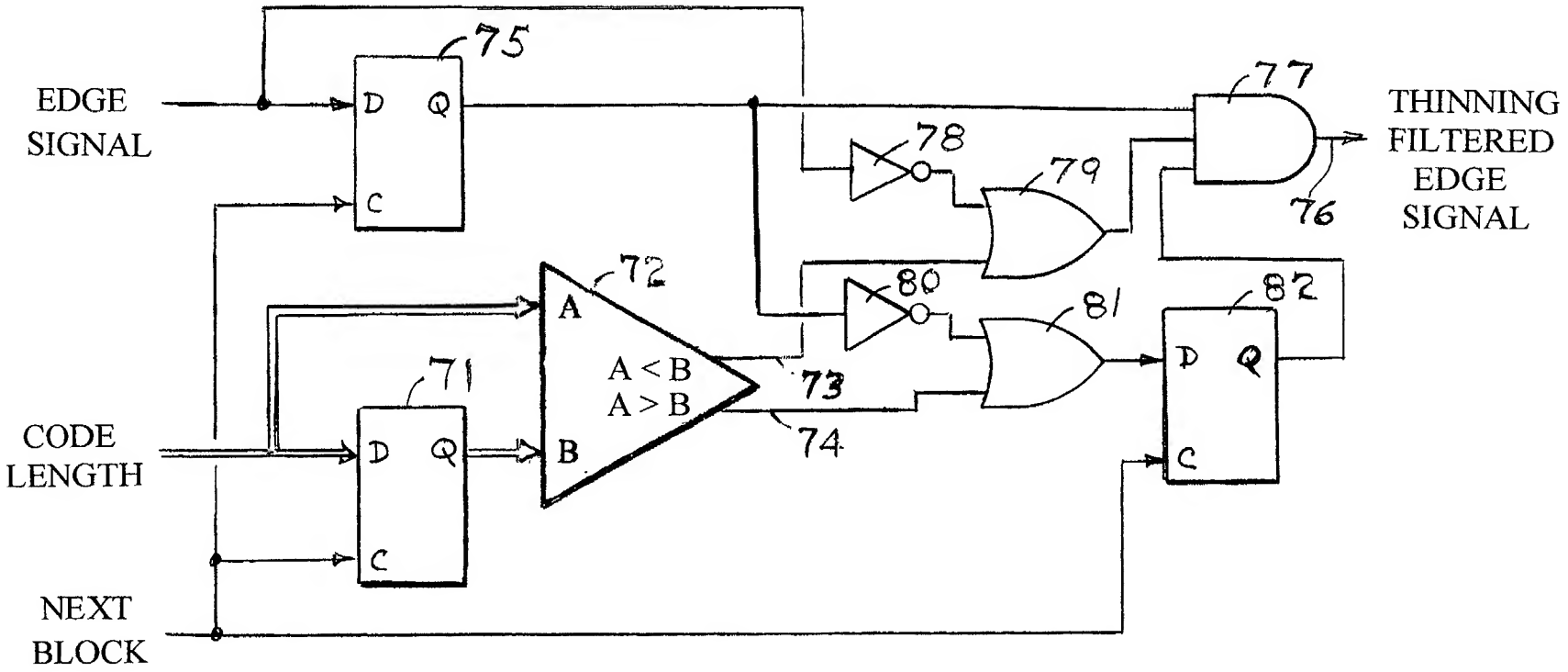
EDGE SIGNAL
CODE LENGTH
NEXT BLOCK
D
Q
C
A
B
A < B
A > B
75
71
72
73
74
76
77
78
79
80
81
82
THINNING FILTERED EDGE SIGNAL

FIG. 6

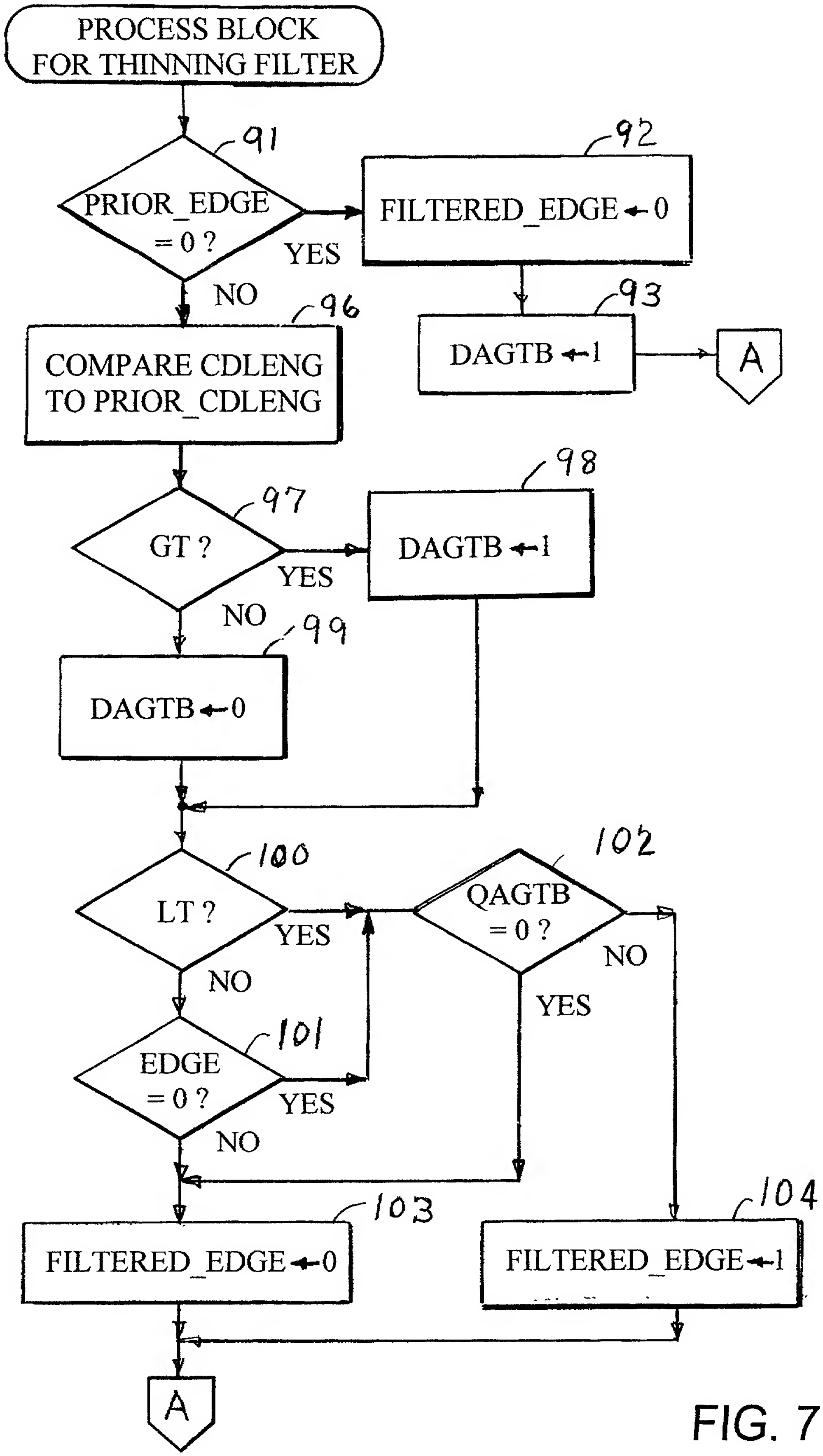
PROCESS BLOCK FOR THINNING FILTER
PRIOR_EDGE = 0 ?
91
YES
NO
FILTERED_EDGE ← 0
92
DAGTB ← 1
93
A
COMPARE CDLENG TO PRIOR_CDLENG
96
GT ?
97
YES
NO
DAGTB ← 1
98
DAGTB ← 0
99
LT ?
100
YES
NO
QAGTB = 0 ?
102
NO
YES
EDGE = 0 ?
101
YES
NO
FILTERED_EDGE ← 0
103
FILTERED_EDGE ← 1
104
A

FIG. 7

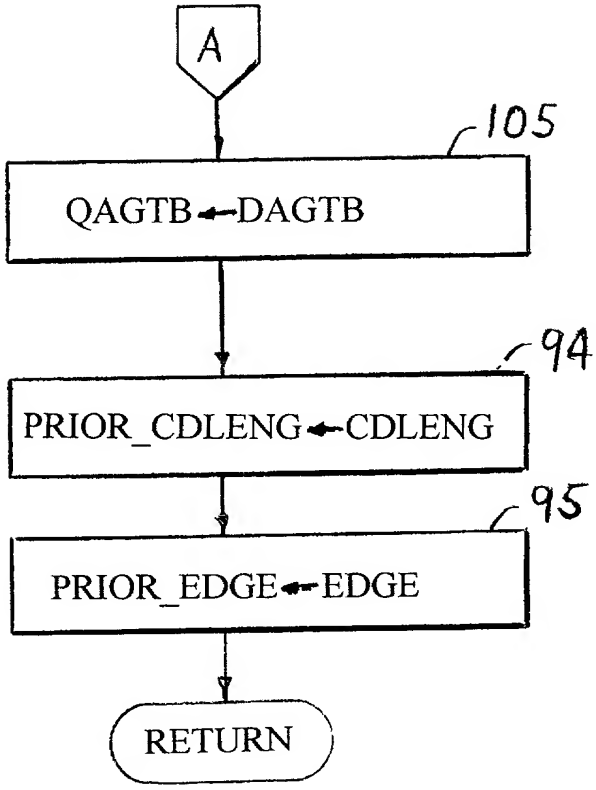
A
105
QAGTB←DAGTB
94
PRIOR_CDLENG←CDLENG
95
PRIOR_EDGE←EDGE
RETURN

FIG. 8

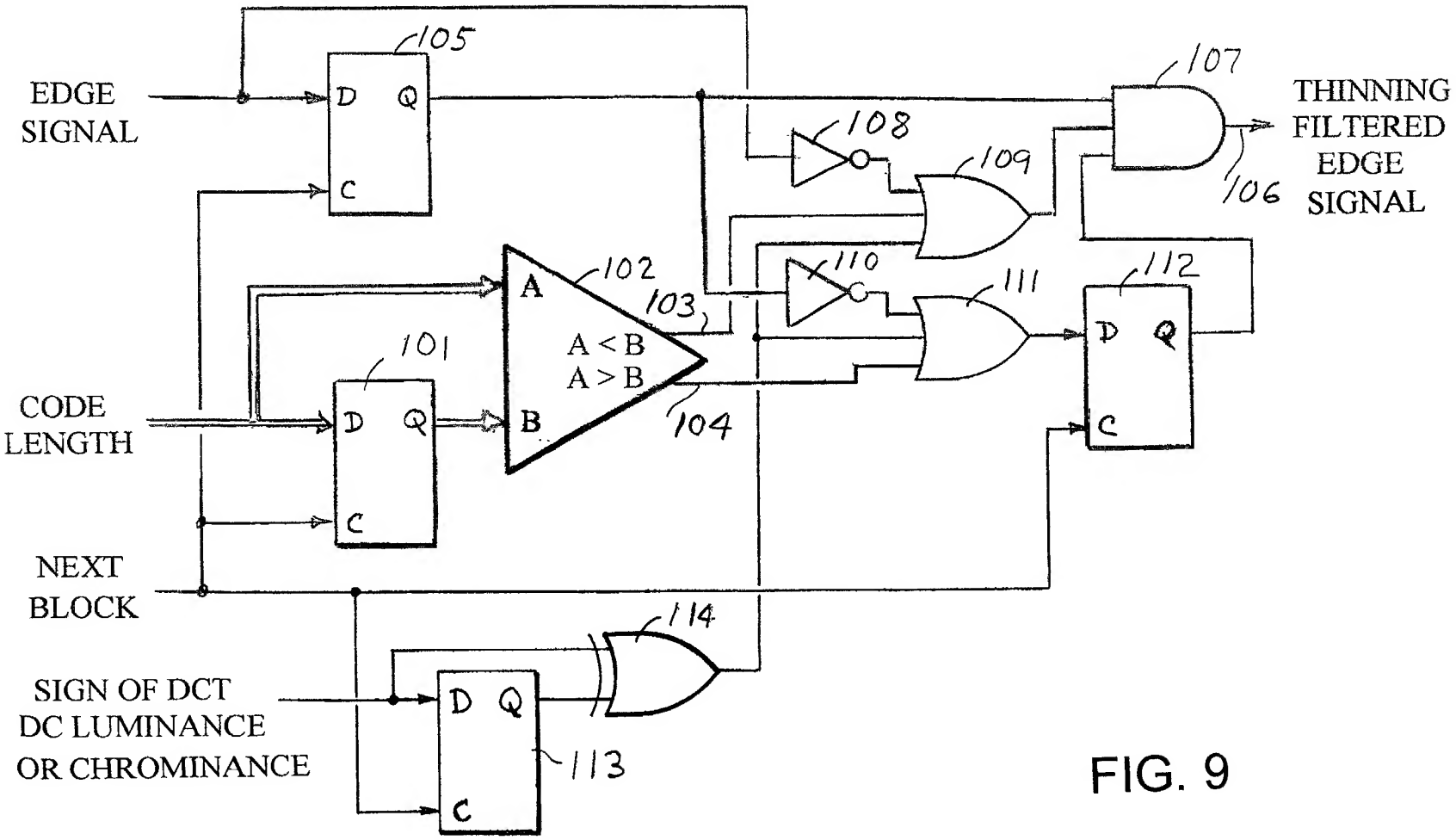

FIG. 9

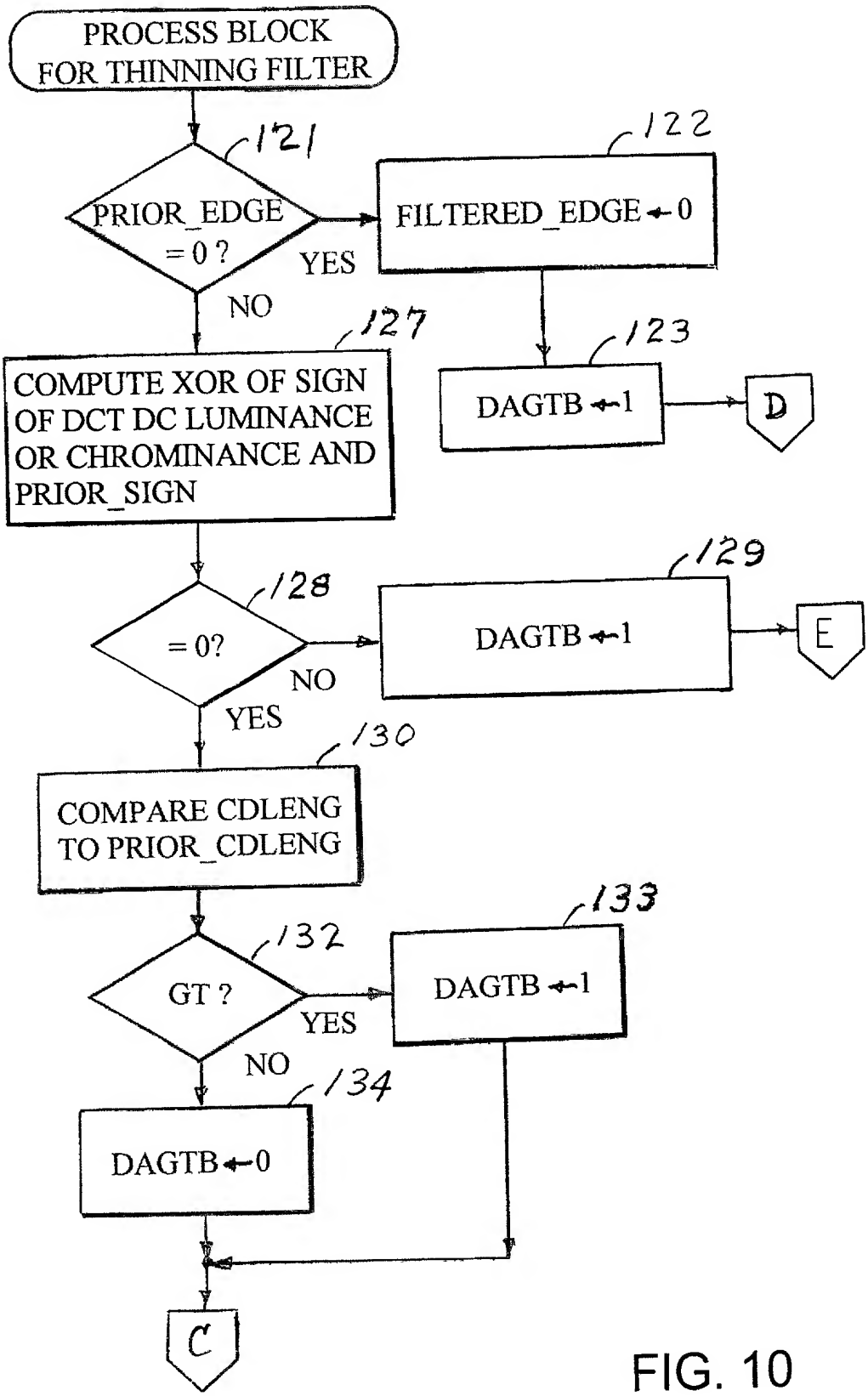

FIG. 10

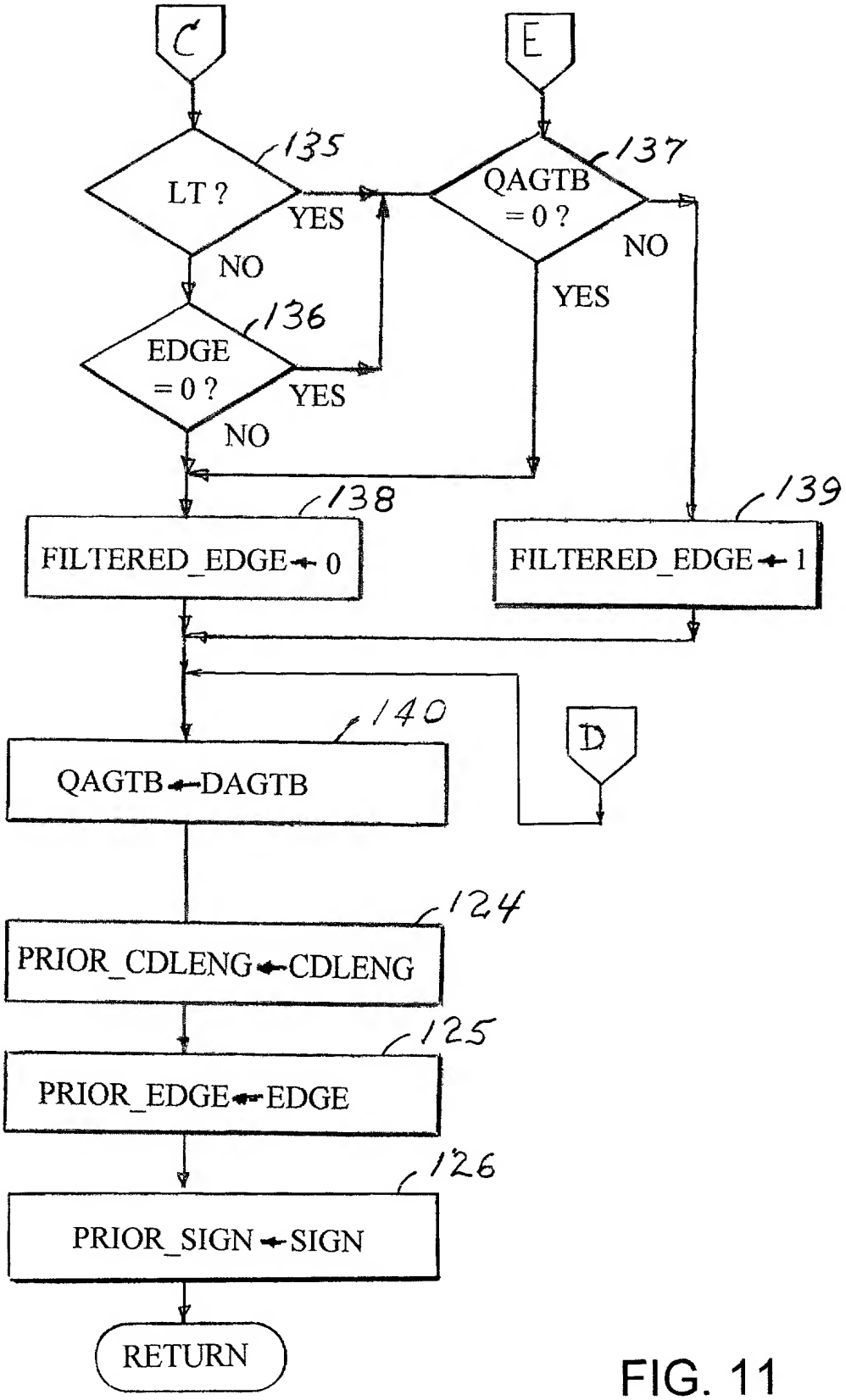

FIG. 11

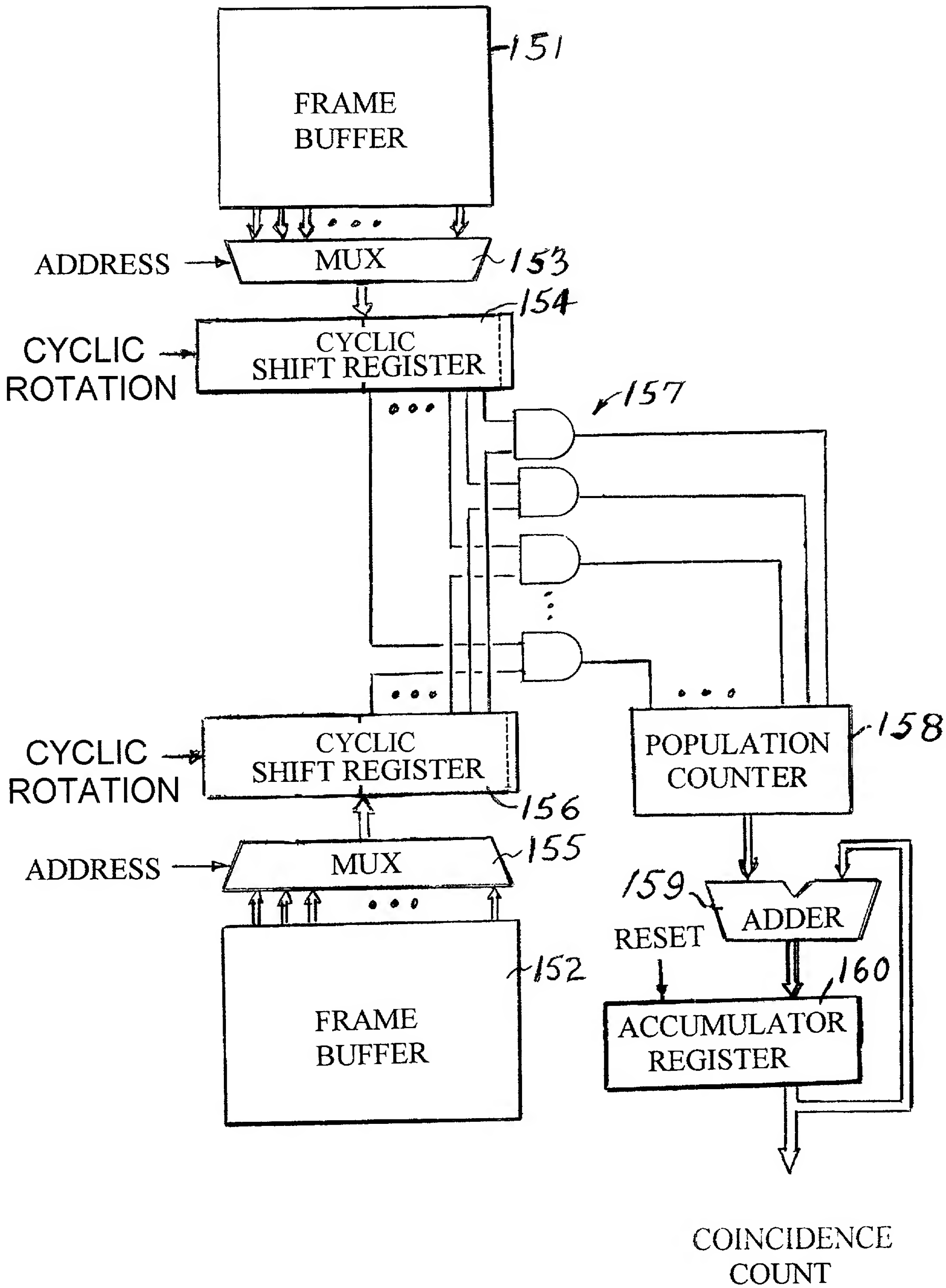
FRAME
BUFFER
151
ADDRESS
MUX
153
154
CYCLIC
ROTATION
CYCLIC
SHIFT REGISTER
157
CYCLIC
ROTATION
CYCLIC
SHIFT REGISTER
156
POPULATION
COUNTER
158
ADDRESS
MUX
155
159
ADDER
RESET
160
ACCUMULATOR
REGISTER
FRAME
BUFFER
152
COINCIDENCE
COUNT

FIG. 12

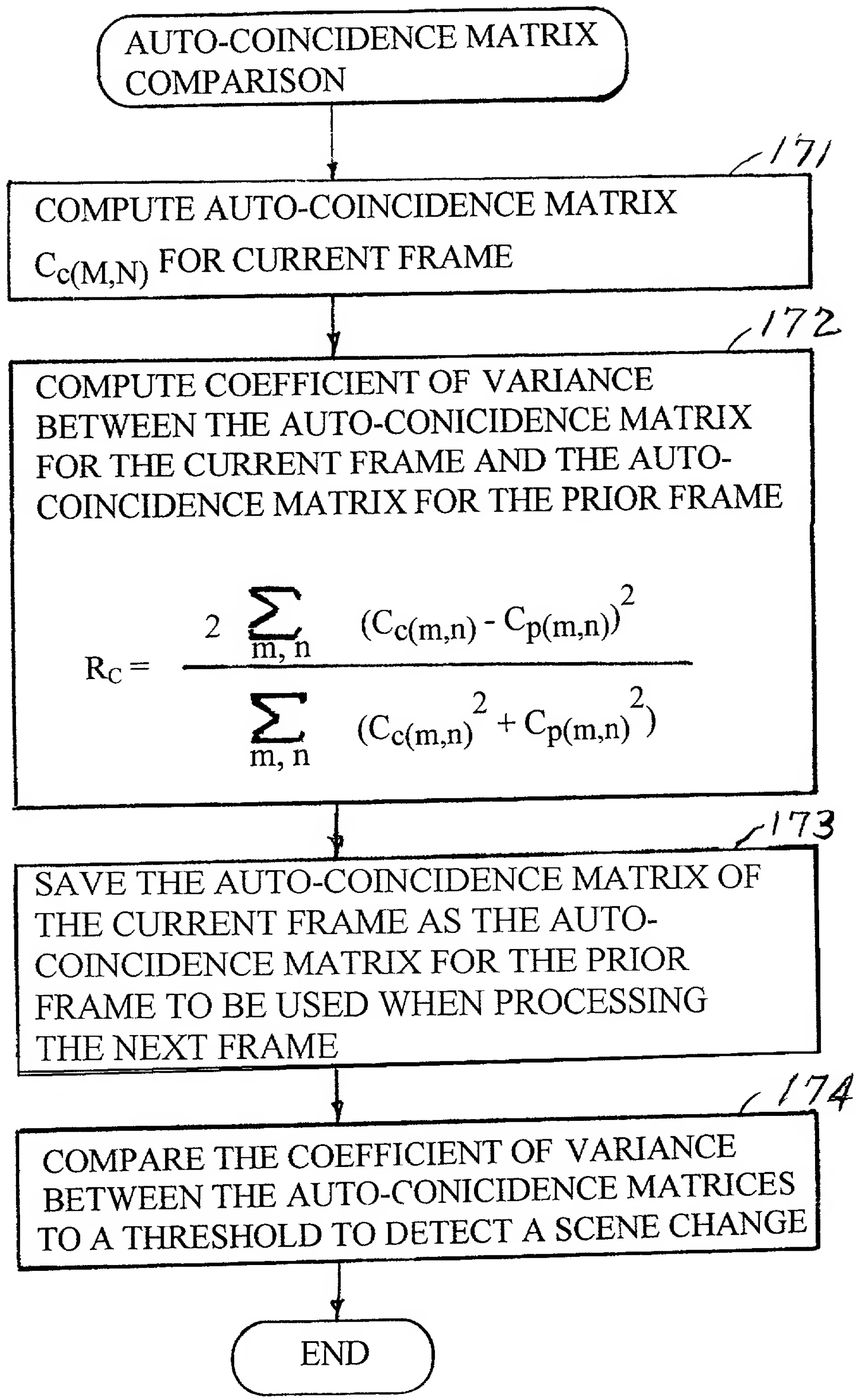
AUTO-COINCIDENCE MATRIX COMPARISON
171
COMPUTE AUTO-COINCIDENCE MATRIX $C_{c(M,N)}$ FOR CURRENT FRAME
172
COMPUTE COEFFICIENT OF VARIANCE BETWEEN THE AUTO-CONICIDENCE MATRIX FOR THE CURRENT FRAME AND THE AUTO-COINCIDENCE MATRIX FOR THE PRIOR FRAME
$R_C = \frac{2 \sum_{m,n} (C_{c(m,n)} - C_{p(m,n)})^2}{\sum_{m,n} (C_{c(m,n)}^2 + C_{p(m,n)}^2)}$
173
SAVE THE AUTO-COINCIDENCE MATRIX OF THE CURRENT FRAME AS THE AUTO-COINCIDENCE MATRIX FOR THE PRIOR FRAME TO BE USED WHEN PROCESSING THE NEXT FRAME
174
COMPARE THE COEFFICIENT OF VARIANCE BETWEEN THE AUTO-CONICIDENCE MATRICES TO A THRESHOLD TO DETECT A SCENE CHANGE
END

FIG. 13

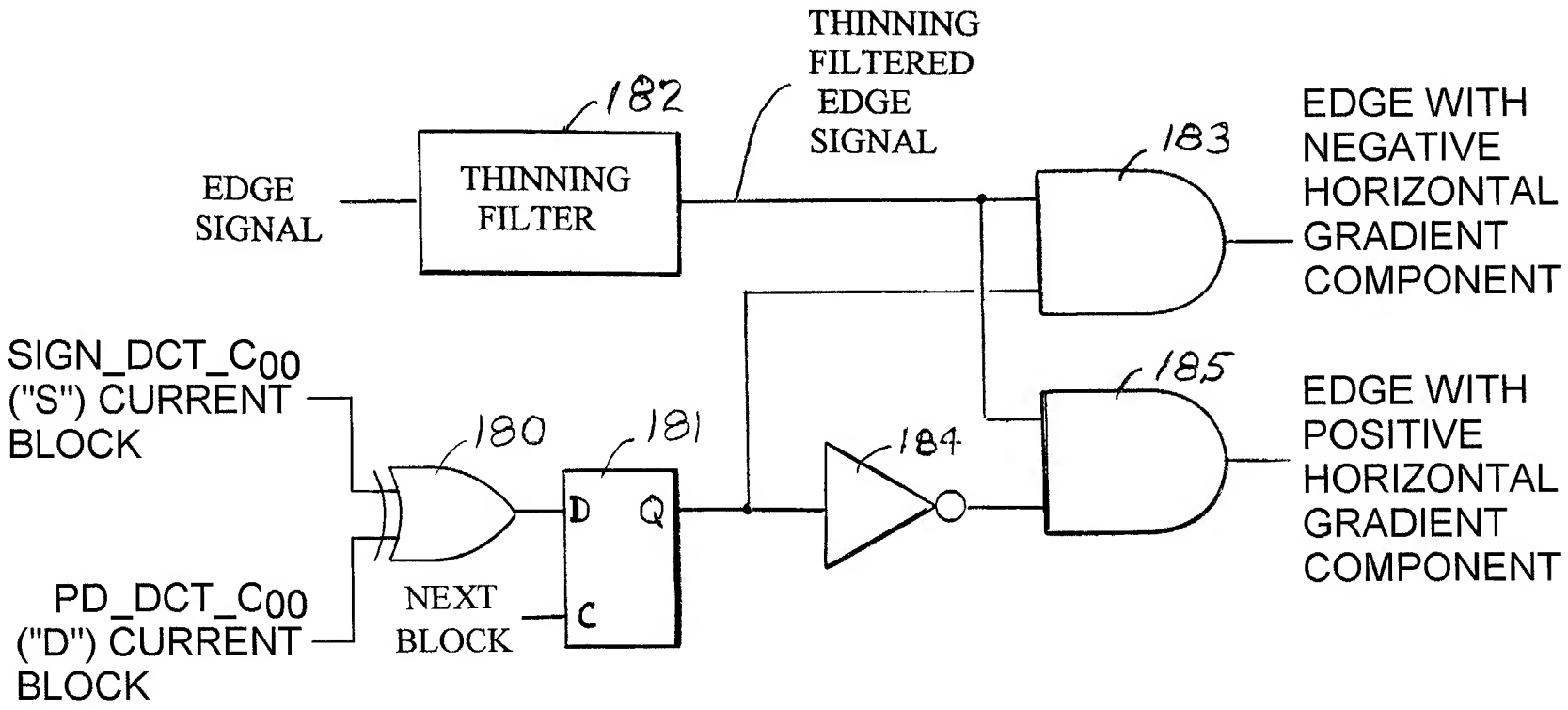

FIG. 14

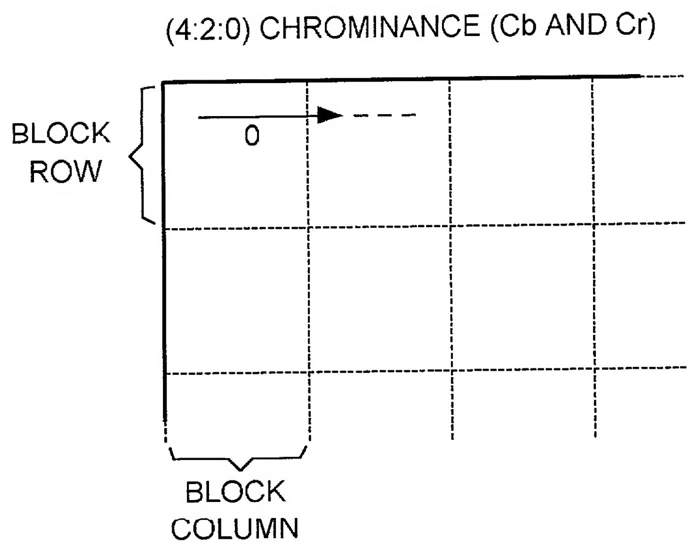

FIG. 15

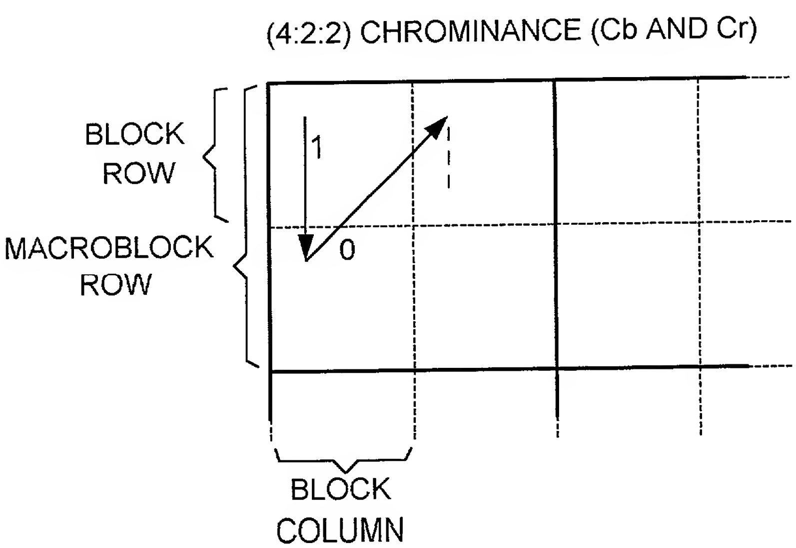

FIG. 16

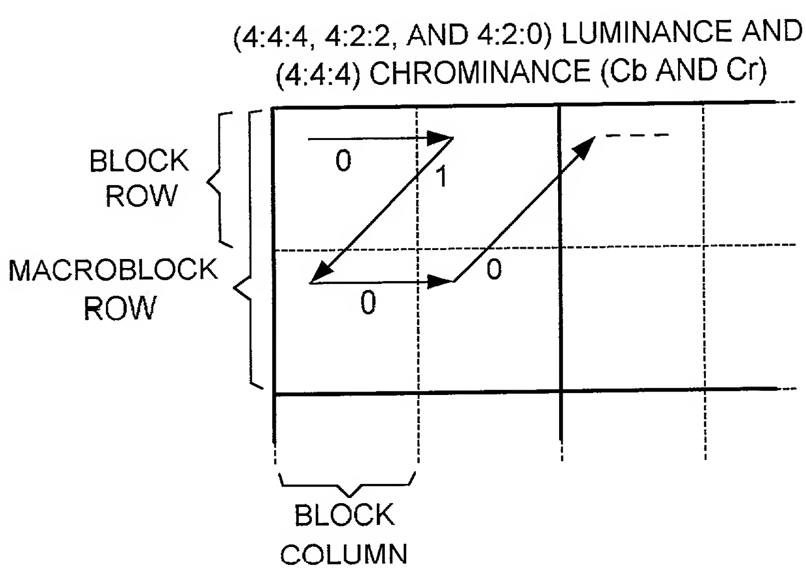

FIG. 17

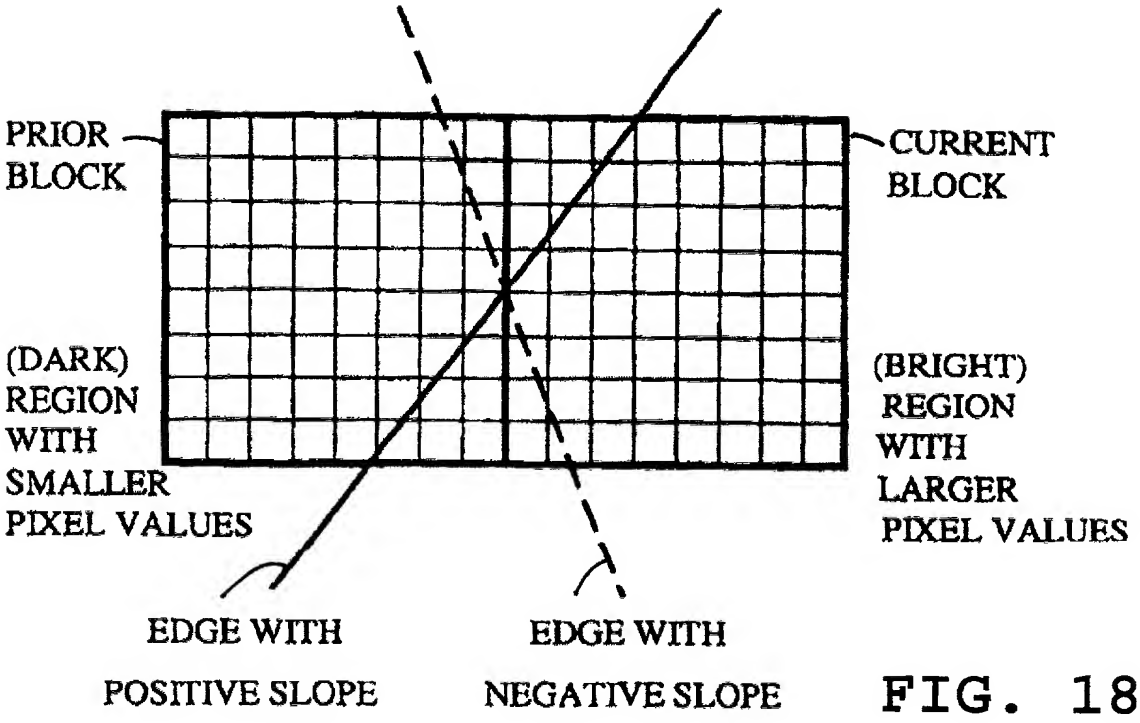

FIG. 18

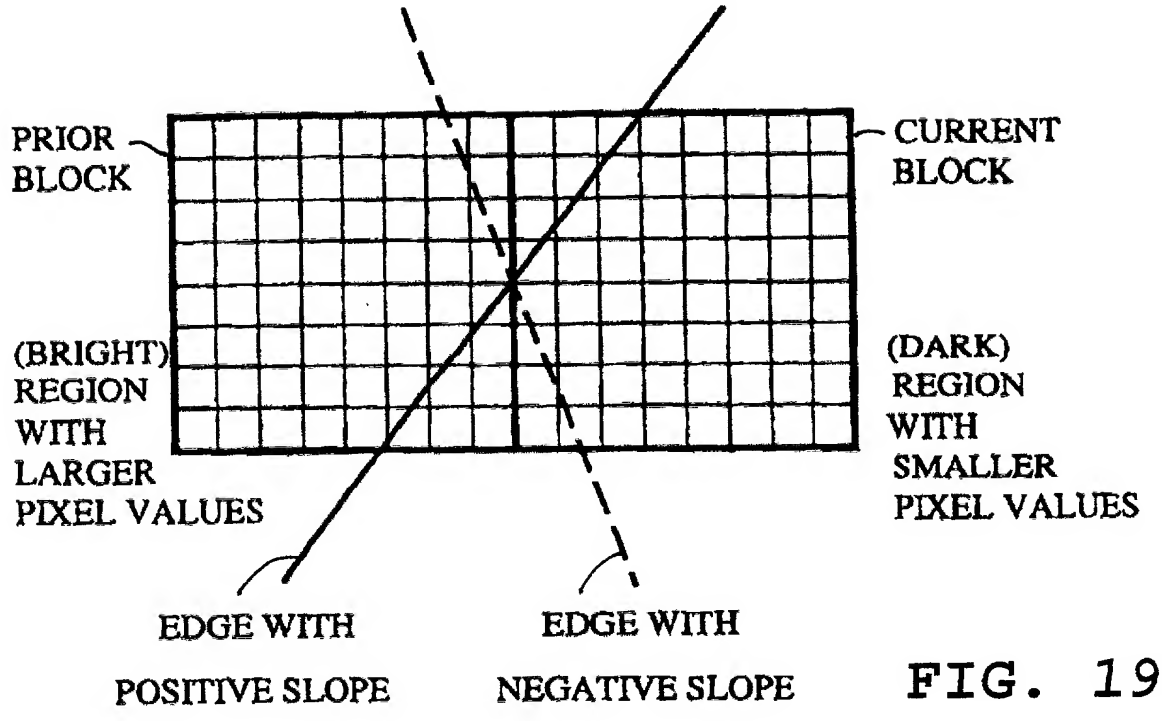

FIG. 19

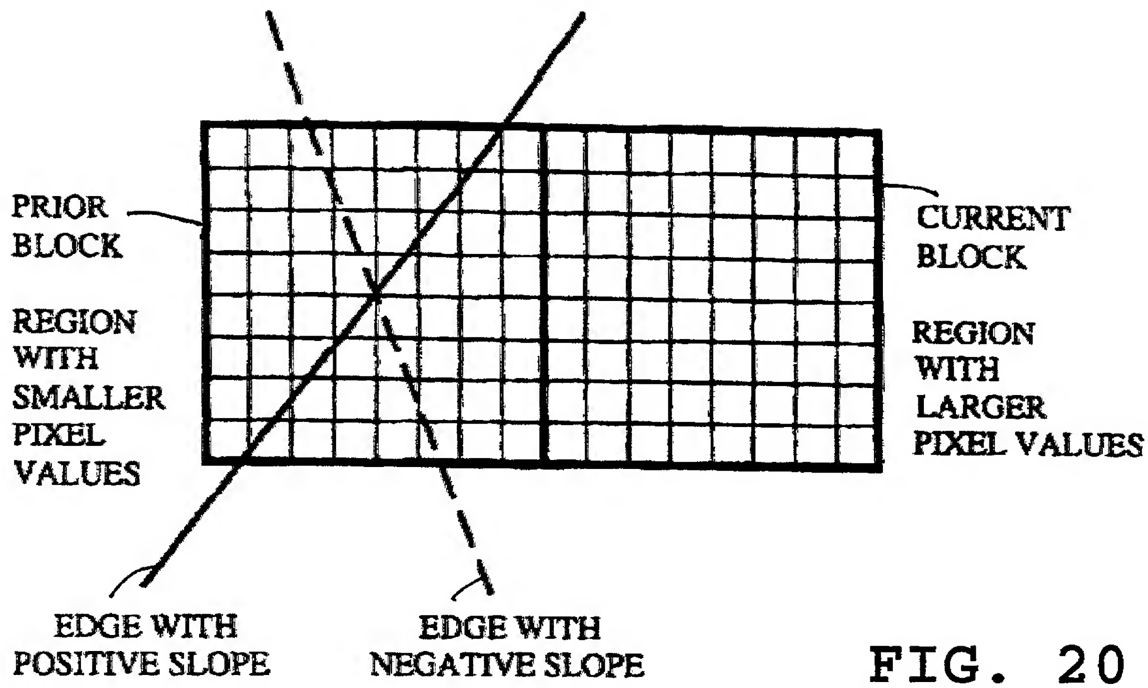
PRIOR BLOCK
REGION WITH SMALLER PIXEL VALUES
CURRENT BLOCK
REGION WITH LARGER PIXEL VALUES
EDGE WITH POSITIVE SLOPE
EDGE WITH NEGATIVE SLOPE

FIG. 20

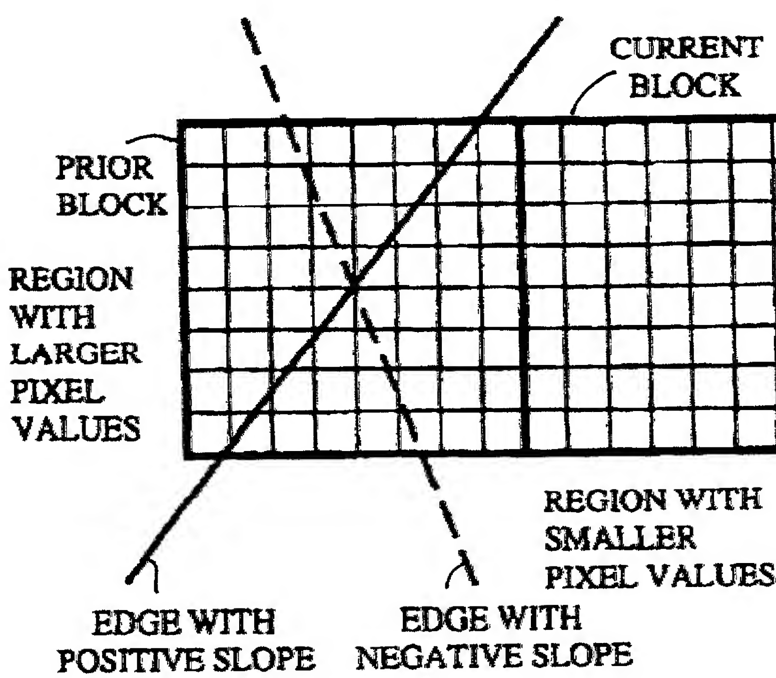
CURRENT BLOCK
PRIOR BLOCK
REGION WITH LARGER PIXEL VALUES
REGION WITH SMALLER PIXEL VALUES
EDGE WITH POSITIVE SLOPE
EDGE WITH NEGATIVE SLOPE

FIG. 21

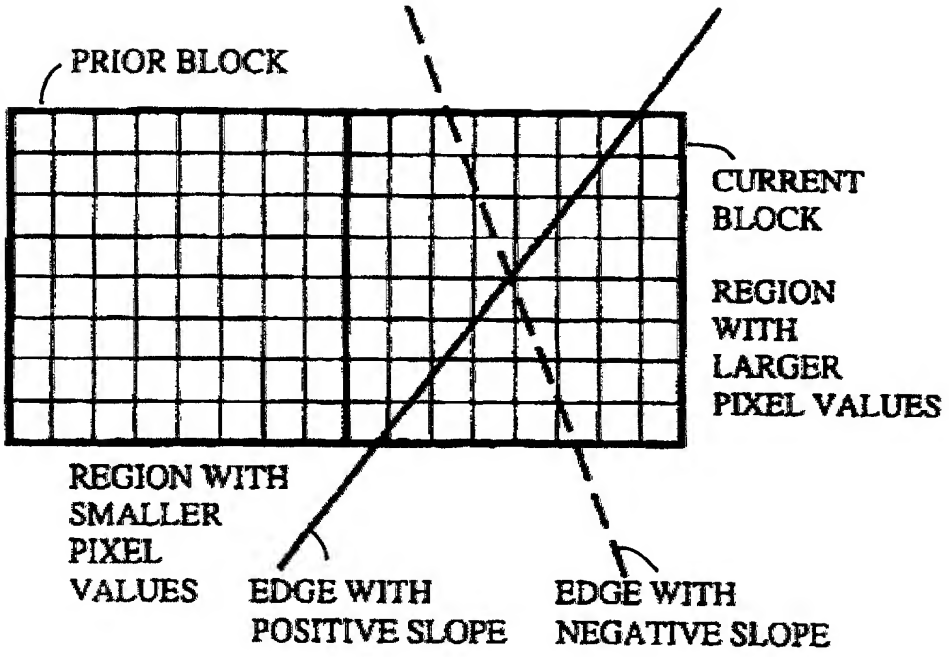

FIG. 22

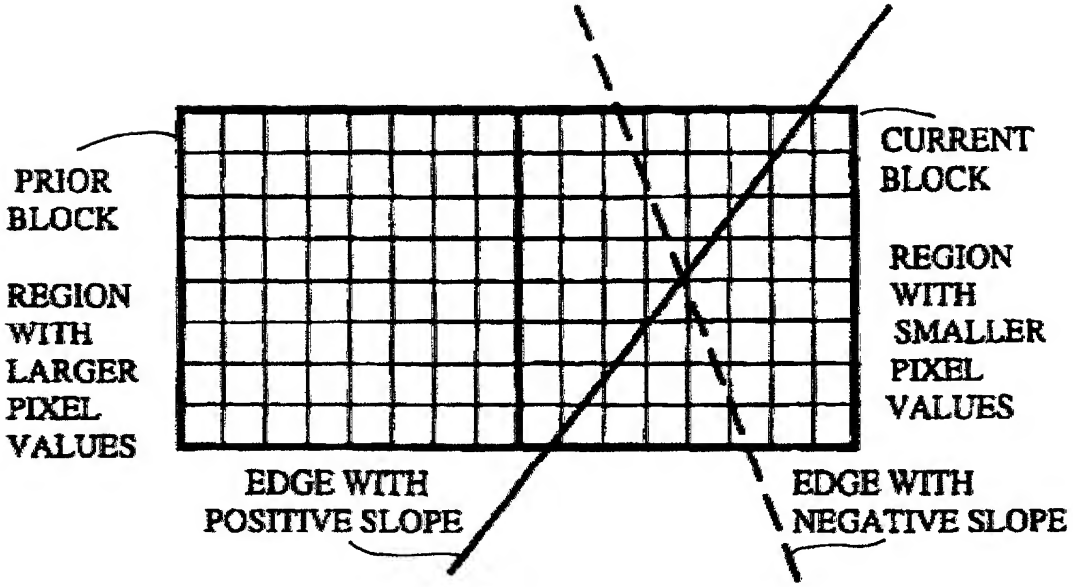

FIG. 23

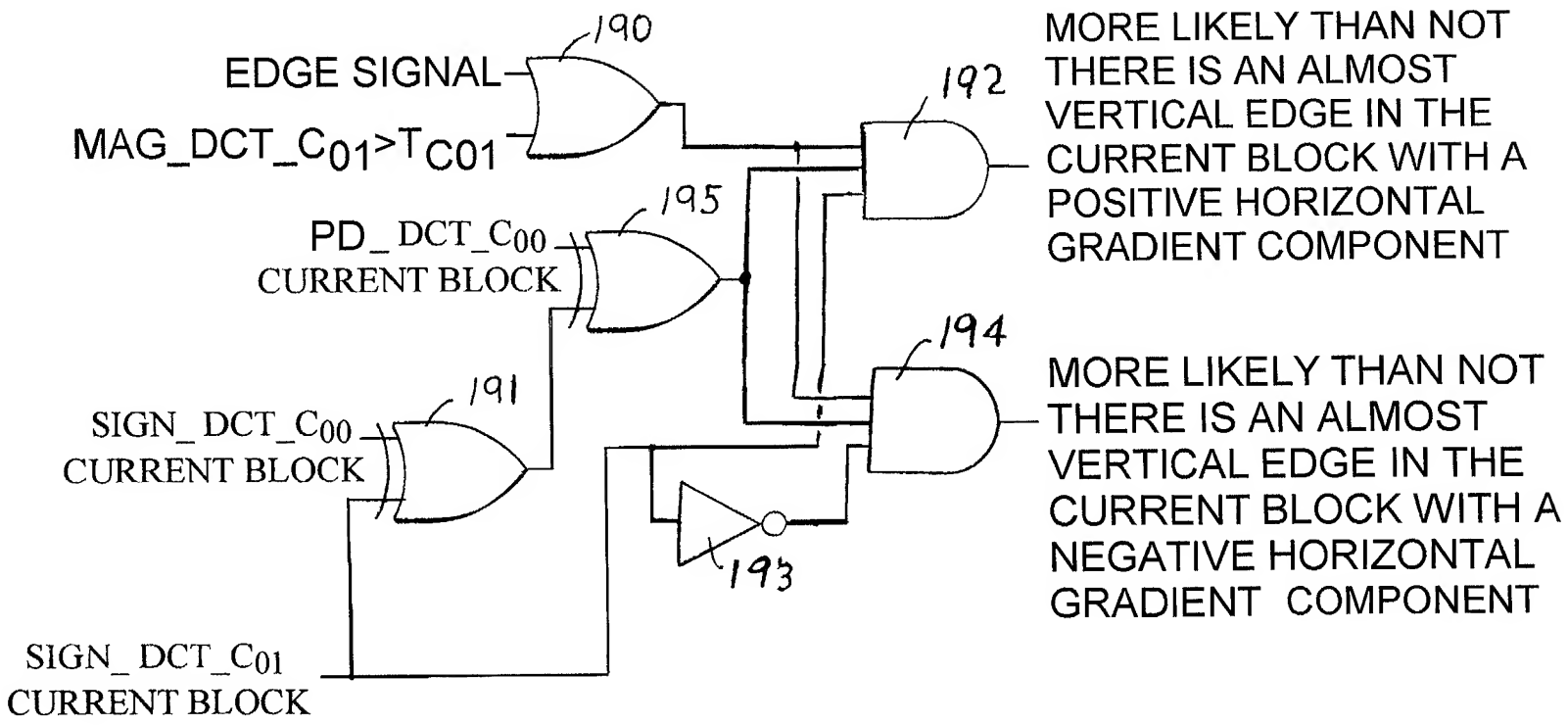
190
EDGE SIGNAL
MAG_DCT_C01>TC01
192
MORE LIKELY THAN NOT THERE IS AN ALMOST VERTICAL EDGE IN THE CURRENT BLOCK WITH A POSITIVE HORIZONTAL GRADIENT COMPONENT
195
PD_DCT_C00
CURRENT BLOCK
194
191
SIGN_DCT_C00
CURRENT BLOCK
MORE LIKELY THAN NOT THERE IS AN ALMOST VERTICAL EDGE IN THE CURRENT BLOCK WITH A NEGATIVE HORIZONTAL GRADIENT COMPONENT
193
SIGN_DCT_C01
CURRENT BLOCK

FIG. 24

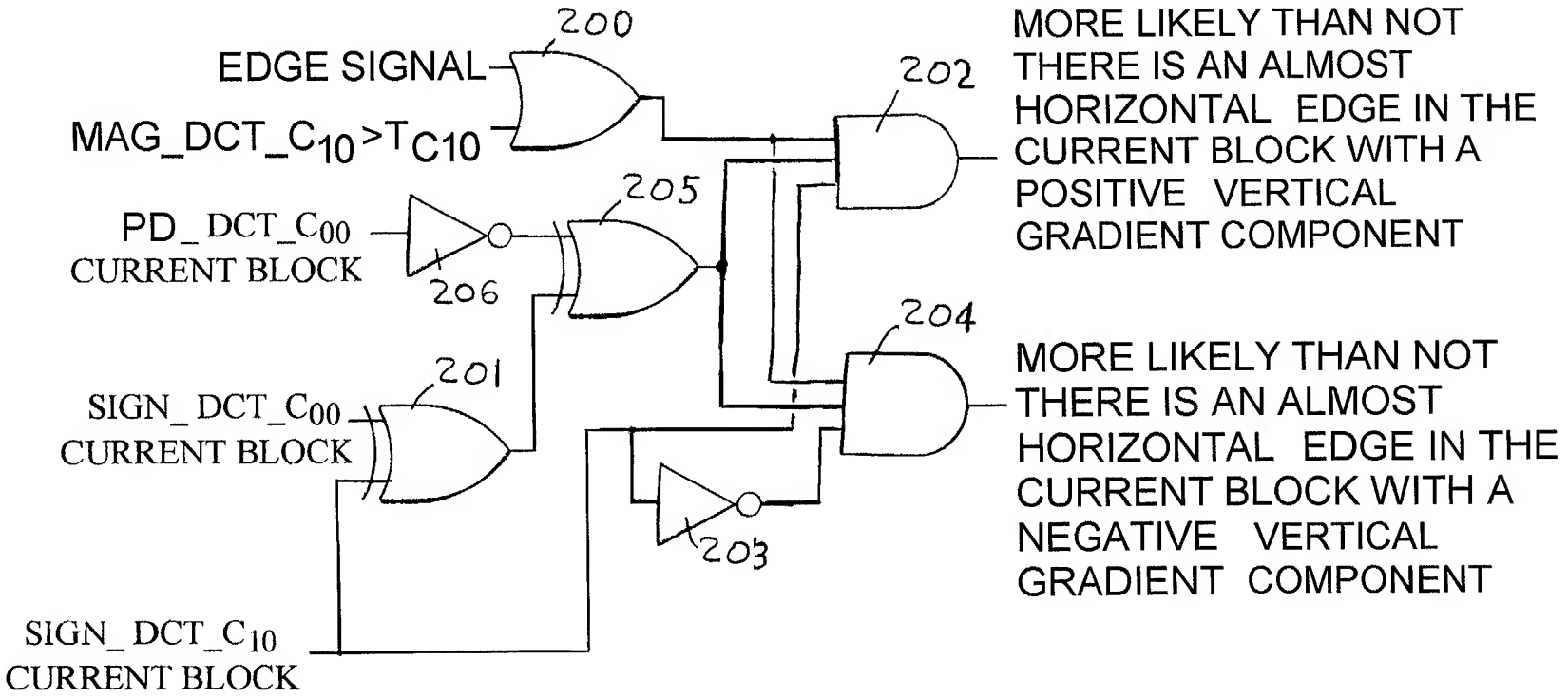

FIG. 25

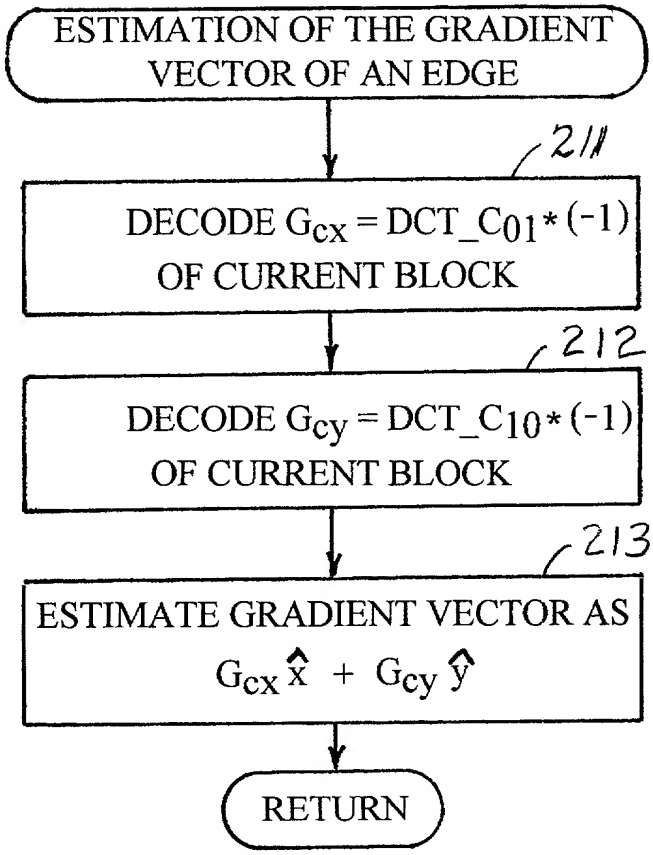

FIG. 26